

2000

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Karen A. Brown

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Developing project management skills: A service learning approach

Karen A Brown. *Project Management Journal*. Sylva: Dec 2000. Vol. 31, Iss. 4; pg. 53, 6 pgs

Subjects: Community service, Project management, Skills, MBA programs & graduates, College students, Home building

Classification Codes 2310, 9190, 8306, 1220

Locations: United States, US

Author(s): Karen A Brown

Article types: Feature

Publication title: *Project Management Journal*. Sylva: Dec 2000. Vol. 31, Iss. 4; pg. 53, 6 pgs

Source Type: Periodical

ISSN/ISBN: 87569728

ProQuest document ID: 64933126

Text Word Count 4755

Article URL: http://gateway.proquest.com/openurl?ctx_ver=z39.88-2003&res_id=xri:pqd&rft_val_fmt=ori:fmt:kev:mtx:journal&genre=article&rft_id=xri:pqd:did=000000064933126&svc_dat=xri:pqil:fmt=txt&req_dat=xri:pqil:pq_clntid=17867

Abstract (Article Summary)

This paper describes a unique approach to project management education. MBA students enrolled in a project management course have been renovating homes for low income senior citizens. Concurrent with instruction and project planning and control methods, students must communicate with the customer, plan tasks, coordinate schedules, procure materials, learn construction skills, perform physical labor and track project progress. Reflection activities ensure that students see the broadly applicable metaphors that emerge from the experience. Results indicate that a community service project can provide a powerful learning vehicle. Evidence from similar programs run through corporations suggests that this approach is suited to industry applications as well.

Full Text (4755 words)

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[Headnote]

Abstract

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This paper describes a unique approach to project management education. MBA students enrolled in a project management course have been renovating homes for low-income senior citizens. Concurrent with instruction in project planning and control methods, students must communicate with a customer, plan tasks, coordinate schedules, procure materials, learn construction skills, perform physical labor, and track project progress. Reflection activities ensure that students see the broadly applicable metaphors that emerge from the experience. Results indicate that a community service project can provide a powerful learning vehicle. Evidence from similar programs run through corporations suggests that this approach is suited to industry applications, as well.

Keywords: project management education, service learning; instructional innovation

Organizations in all segments of the economy are in need of effective project managers (Thoms & Pinto, 1999). Experience and on-the-job training are important factors in preparing individuals for these roles. However, formal project management education is in high demand because of the potential value that it can add (Duncan, 1993). The activities of the Project Management Institute provide testimony to this trend, in themselves, but public seminars, company in-house programs, and curriculum content in schools of business and engineering provide additional examples of the rise in educational offerings for project management.

Although traditional classroom instruction in technical tools is very popular, some advocate more holistic approaches that include leadership, interpersonal skills, and administrative aspects. A typical classroom experience, even with a comprehensive case study, cannot always integrate the social and technical lessons in ways that allow students to develop higher-level cognitive skills they will need in practice (Hingorani, Sankar, & Kramer, 1998). Additionally, training program participants often enter a classroom with a wide range of knowledge levels, making it difficult for the instructor to target the appropriate level of instruction with a lecture-style delivery format.

Those who are involved in project management training are aware that many ideas have surfaced for making the subject matter more accessible and meaningful to students who may differ widely in their entrylevel knowledge bases. Examples of useful methods include computer simulations (Brown, Klasterin, & Valluzzi, 1989), project management internships (Bobrowski & Kumar, 1992), and information technology (IT)-based methods that put students in "virtual" contact with a project site (Hingorani et al., 1998). Computer simulations give students experience working in teams to manage the dynamics of changing project conditions. However, these conditions are limited to a small set of variables that cannot entirely reflect reality. Additionally, simulations do not provide contact with a real client and the uncertainties that accompany this dimension of project work. Project management internships effectively answer the call for adding a client and a full range of uncertainties to the mix of learning variables. However, they typically involve one student at a time, limiting the opportunity for interactive debriefing and collective reflection. Additionally, an internship, if it is done with careful supervision from an instructor, can be highly labor intensive for the faculty adviser. Virtual contact with a project site, mediated through IT, can answer many of the limitations associated with other methods. However, because students are not actually involved in the project, they do not act on the decisions they make or live with the consequences. In spite of what might be considered minor limitations, all of these methods offer the advantage of putting the subject matter at center stage and placing the instructor in the role of facilitator (Palmer, 1998).

This paper describes a method that goes beyond more commonplace technique-oriented teaching innovations and addresses some of the limitations of simulations, internships, and IT-based virtual methods. The service-learning method delivers an educational experience that is content-rich, develops higher-level cognitive skills, and appears to provide lasting value to students. The application described here takes place in an MBA program, but the concept can work equally well in corporate settings.

A Description of the Course

In an MBA project management elective, students learn and apply project planning and management skills to a community service effort. The entire class renovates the home of a low-income senior citizen in Seattle's predominantly African-American central area. Because the course is part of an evening MBA program for working professionals, physical project work is limited to two or three weekends. Students are faced with the challenge of structuring and prioritizing a very loosely defined problem and carrying it forward to completion on a short-time horizon, all carefully choreographed in cooperation with each other, volunteer workers, material donors, technical experts, and the client.

Some students enter the course with little knowledge of project management tools, and others may have relatively strong expertise. The mixture proves to be one of the great strengths of the course because the experiential teaching vehicle allows each person to learn at his or her level of need. Additionally, cooperation among those with varying levels of knowledge creates a fertile environment for mentoring.

Course Content. The course blends the topics normally covered in a project management class with the realities of an actual project environment. Thus, we address such traditional components as problem definition, establishing project mission and objectives, determining project scope, budgeting, client relations, developing a statement of work, assessing risk, creating a work breakdown structure (WBS), developing a bill of materials, computerized project scheduling, change management, resource allocation, supply management, teamwork, leadership, monitoring progress, and postproject assessment.

Additionally, other unexpected issues arise as the project unfolds, so that the list of topics always expands beyond the traditional set.

Team Organization. This is an important aspect of the class because it is closely tied to the WBS. Groups usually include a mix of expertise levels, and they often solicit help from professionals in the field who volunteer their time to assist with technical tasks. But, the students do nearly all of the work themselves.

Teams for the projects vary from year to year, depending on the needs of the client, but have generally included: overall coordination (leadership, coordination, big-picture scheduling, resource allocation, change management, conflict resolution, progress monitoring), support (food, comfort, expediting supply deliveries, budget, client relations, neighbor relations), safety, roofing, carpentry, drywall, flooring, electrical, plumbing, windows, painting, landscaping, and moving furniture.

In addition to planning and executing its tasks, each team is responsible for procuring material donations. At first, many students seem uncomfortable with the idea of asking for donations. They soon learn, however, that most businesses are very willing to assist with such a worthwhile project. So far, over 100 businesses in the Puget Sound area have contributed materials and technical expertise to the project.

Course Structure and Process. The course is structured to provide the students with the knowledge they will need for planning and managing the project. During approximately 20 hours of preproject instructional time, concepts and tools are introduced in a sequence that, as much as possible, matches team needs. In keeping with the recommendations of Hingorani et al. (1998), project management tools are initially introduced in a structured lecture-style format. Every tool is taught in relation to the project, and as each tool is introduced, students gather in their assigned project teams to apply that tool to the renovation project. So, for example, when we discuss work breakdown structures, I introduce the brainstorming tool known as mind-mapping (Buzan, 1983), then put the students to work in teams to develop a WBS for their part of the project (e.g., roofing, painting, drywall). Also, for example, when we get to scheduling, students work in their teams to arrange WBS elements using Post-It Notes on butcher paper, then transfer their schedules to Microsoft Project. For each project management tool, students also prepare individual homework assignments-this ensures that all team members master the technical material.

During the planning period, we also visit the project site several times to gather information, establish needs, and develop a relationship with the client. Seeing the sorry state of a client's living conditions provides students with a tremendous passion to take action.

At the end of the six-week planning phase, we execute the project on two or three full weekends. The overall coordination team schedules the timing of team activities on a large PERT chart displayed at the project site. Change orders, client involvement, the weather, rework (e.g., a student accidentally put his foot through a newly installed window), team conflict, battles over access to space, and material delays all enter the picture. In the end, a seemingly impossible task actually gets done in an incredibly short period of time. The students learn that their careful planning, good teamwork, and the underlying structure of the network schedule all pay off.

After the project is complete, we meet on at least two subsequent evenings to wrap up the project, review punch lists, assess key learning points, discuss additional tools and concepts for project management, and hear from guest speakers. The guest speakers are experienced project managers, and have been persuaded to visit the project site while the students are working so that they can reflect on what they have witnessed. This proves to be a nice way to draw the lessons from the project into a broader realm of application.

Post-project assessment is an important part of the project management life cycle (Busby, 1999). As part of this assessment process, each student keeps a log documenting his or her experiences and reflections during the project, and each team prepares a performance assessment and analysis report at the end of the term. The students are challenged to think critically about the experience, link their observations with course concepts, and discuss how they can apply what they learned to future projects. These post-project assessment activities prove to be useful in that they encourage students to reflect, thereby increasing the quality of learning outcomes (Youniss & Yates, 1997).

Project History

Although the planning phase of the course is relatively structured, the renovation projects, contextual factors, and the mix of students involved ultimately determine the additional lessons that will emerge. Below is a brief accounting of some of the outcomes that have grown out of each experience.

Year One: Mr. "S" and the Leaky Roof. When we visited our first project site, we found a widower whose roof leaked so badly that all of the plaster had been washed from the lath in the ceilings of most of the house. He had no heat, no operating stove, and no hot water. The students felt great empathy toward the client, often adding tasks that were not within the scope limits established at the front end of the project. For example, when the project was nearly complete, a "renegade" group of students decided to remodel Mr. "S"'s bedroom. This room had previously

been out of scope because our client needed a place to live while the construction was under way. The added effort affected several other important tasks—for example, the material that was moved out of the bedroom to make way for painting and closet construction had to be moved to the living room, interfering with critical-path painting tasks in that room. This raised considerable controversy, all of which fed nicely into post-project discussions about scope creep, addressing the client's latent needs, and managing the critical path.

In three weekends, the students re-roofed the house, replaced drywall, built closets and shelves, replaced the kitchen floor, put in a new toilet, replaced exterior doors and hardware, installed an entirely new electrical system, installed new lighting, put in all new double-pane windows, built stair railings, painted the entire interior of the house, added curtains and blinds, contributed numerous home-decorating touches, trimmed shrubbery, added walkways, and filled two 30-yard dumpsters and several pick-up trucks with debris. Students expressed great satisfaction with the learning experience, in spite of the heavy workload.

Year Two: Mrs. "C" and Her Helpful Family. The second year was similar to the first, except that the house was larger, the debris was greater, there was more exterior work to be done, and the class was given less time to complete the project. The students did it, and were very proud of themselves for outperforming the year-one class. All agreed that good planning and effective teamwork were the keys to their success. Many students from the year-one class were on-hand as experienced volunteers.

As in year one, the students grew very attached to the client, this time a sweet elderly woman (Mrs. "C"), and their greatest challenge was to reasonably limit their scope. However, we had an added complication in year two because our client's children and grandchildren began to take an interest in assisting us. Her problems had been too overwhelming for them to tackle, but once we gave the solution some structure and got started, they wanted to pitch in. One Sunday night, after the students had left the project site, two of Mrs. "C's" grandsons tore out all of our new wiring so that they could make some changes in the upstairs walls. There were many expressions of anger flying through the class e-mail network the next day, but, ultimately, the problem was resolved. The incident raised discussion issues centered on conflicting requests from the same customer organization, and managing customer involvement so that it does not interfere with project progress.

Year Three: Mr. "O" and the Big Budget. In year three, our client was a retiree suffering from the effects of a recent stroke. His house had accumulated many needed repairs, and he was physically and financially unable to take care of them. His financial situation was compromised by the support he was providing to members of his extended family who had moved into his home because of challenges in their personal lives. The roof leaked badly, the owner had accumulated quite a bit of "stuff" (although not to the extent of our other clients), and there were obvious needs for plaster repair, safer flooring, painting, and window replacement.

One interesting scenario from year three occurred in relation to the installation of new flooring. A local supplier had donated \$5,000 worth of material, enough for the entire, rather large, house. The material was a simulated wood that had to be installed very painstakingly in three-inch wide strips, but the flooring group enthusiastically committed to installing it in all rooms. However, team members discovered that their learning-curve estimates had been incredibly ambitious (not an uncommon problem in project management). They also discovered that when they were working in a particular room, no other teams could work there at the same time. (The lesson here was that space is a shared resource.) The critical path quickly shifted to flooring, and although the team generously volunteered extra mid-week time, it became clear that it was jeopardizing the project completion date. Team members came to realize that just because a resource is available does not necessarily mean that it must be used. They scaled back the scope of the flooring task, electing to patch some floors and carpet others. We discussed the incident later as a good example of a team's willingness to subordinate its own esthetic satisfaction to overall project performance. Moreover, it provided an opportunity for discussing the notion of resource-based critical chains (Goldratt, 1997).

It was my initial sense that the third project would fall somewhere between the previous two in terms of scope, and I felt confident that the two weekends we had allocated for the work would be more than sufficient. However, competition to out-do the previous year's class proved to be a continuing theme. This group exceeded all of my expectations about donations, accumulating nearly \$40,000 worth of value in materials and cash. They re-roofed the house (with extensive help from a local roofing contractor), replaced or repaired all of the flooring, repaired plaster walls, rewired, installed 16 new insulated windows, constructed a new chimney, moved the kitchen to a different room, replaced kitchen appliances with new ones, painted all interior walls, provided several pieces of new furniture, poured a new walkway, and removed three 30-yard dumpsters full of debris. This group's over-the-top accomplishments reinforced my belief in the power of measurement and goal setting, something we discussed in our debriefing sessions. And, once again, the course ended with an energized team, many of whose members are

eager to serve as volunteers on the next project.

Lessons Learned. Regardless of each student's background, he or she can always learn something by participating in a community service project management experience. This has certainly been the case for the nearly 100 students who have been through the service-based project management course. Here are a few examples of project management lessons that have emerged from our post-project reviews:

1. Careful planning really does pay off.

At the beginning of each project, students feel overwhelmed by the enormity of the undefined task that lies before them. (In fact, some admit later that they were initially angry with me for handing them such a difficult task.) Each year, though, they come away from the experience as true believers in the value of good planning. I simply would not be able to convince them, in lectures or cases, of the benefits of project management tools and teamwork. Seeing is believing—a shared experience with opportunity for reflection is the best teacher (Palmer, 1998).

2. Timing and quantity of material deliveries are major factors.

Students have shown a tendency to gravitate toward task scheduling, often overlooking the criticality of material-delivery milestones and bill-of-material quantities. The recurring result is that they wind up losing efficiency by having to make numerous trips to hardware and lumber stores, or experiencing a show-stopping delay because they failed to anticipate the need for a seemingly minor tool or material. These are lessons they all take back to their workplaces.

3. Scope creep is a real phenomenon.

This seems like an easy lesson, but students remember it much more clearly when they have experienced incidents such as the project expansion into the bedroom that was described in relation to the year-one project. Each year, we have been able to link this new understanding with discussions of methods for keeping project teams on track, or expanding project objectives if it is appropriate, when scope-creep temptations enter the picture.

4. Project participants may feel unnecessarily compelled to use a resource, simply because it is available.

The result can be deleterious to the project schedule. The best example from our projects was the flooring situation described in relation to the year-two project. During class discussions, students are able to relate these phenomena to their own work projects. For example, one student commented that her organization has a tendency to design new products based on factory equipment available ("We'd better use composites in order to justify that composite plant."), rather than basing decisions on the performance requirements of the product. They see the folly in these sorts of decisions, and leave the course with a greater resolve to avoid them.

5. Subcontractors do not always share the project vision of the core team.

In this course, subcontractors are represented by the volunteers who come in to assist with the project during the two or three weekends of physical work. Students have seen this in cases and articles, and we will have discussed it in class, but when they experience it firsthand, they remember it. Moreover, class discussions allow us to review methods for getting subcontractors on board with project culture, objectives, and goals.

6. Diplomacy and persuasion are two of the most important skills that a project manager can possess.

Working in tight quarters, with highly interdependent tasks, students experience the conflicts that can arise over shared space, materials, and priorities. It seems that everyone's personal communication style is put under a microscope for examination. Students see clearly that those who are persuasive and diplomatic are usually the most likely to solve problems in ways that are optimal for the project as a whole.

7. It is essential to maintain continued communication with the client.

Although the homeowner is present during most of the work time on these projects, students often find themselves getting carried away with tasks and criteria that may not serve the client's needs. Everyone recognizes the risks

involved in straying from the customer, and students take away ideas and skills for hanging on to the customer's voice throughout the life of a project. As noted by Shenhar, Levy, and Dvir (1997), this is an important element of project performance, but it is easy to lose sight of it during the execution phase.

8. E-mail is a useful communication tool, but it has its limitations.

During this course, students often find themselves deluged with e-mail messages about project planning and progress. This can desensitize team members to email content and cause people to begin ignoring e-mail messages altogether. When that happens, critical information is not properly disseminated, leading to gaps in the project planning process. Additionally, when conflicts arise, they learn that an "e-mail war" never ends in a satisfactory solution. For some kinds of decisions, they all agree, nothing can take the place of face-to-face communication.

These are just a few examples of lessons learned, but the reader should see from the nature of the list that they represent a mix of technical and social factors. Moreover, they support the development of higher-level cognitive skills that are so important in project management (Hingorani et al., 1998).

Outcomes

Beyond the service delivered to a needy individual, and the student learning outcomes described, the course has produced a very positive student response, has won a national instructional innovation award, and has spawned dozens of similar programs.

Student Response. Students have consistently rated the community service project management course as one of the best they have ever taken. This is especially noteworthy because when students make decisions about what is going to happen, and when outcomes are influenced by a third party (the client) and the approaching winter weather, it is potentially difficult to produce universal satisfaction among those involved.

Students' written comments have been overwhelmingly positive. Here are six examples:

1. "Amazing! This was the best, most fulfilling class I have ever taken."
2. "Really made me love project management and think about how I can use it."
3. "The most relevant and applicable course in the MBA program."
4. "I think I learned the most when things went wrong."
5. "This course has convinced me to reroute my career to project management."
6. "Outstanding way to teach project management. Should be used as the benchmark for all universities."

Further evidence of student enthusiasm for this course may be seen in the continuing involvement of project alumni. Nine members of the year-one class volunteered their time and expertise during the year-two project. The pattern was similar in year three, and several people have now participated for three years running. Much of the continued interest draws from a desire to continue learning—they say that they add to their arsenal of project management knowledge each time they participate. Additionally, they say that they want to watch the process more than one time, just to assure themselves that the project management tools really do work consistently and that the successes of previous years' projects were not just the result of good fortune. Three years of similar performance have been quite convincing.

Alumni Service Activities. Further evidence of the value of the course may be seen in the community service projects that course alumni develop through their own work organizations. They see the value of learning project management skills through a real project effort that is not linked to organizational performance, and want to find ways to replicate the experience with their own work teams. Many of them have involved their work teams in programs such as Christmas in April, assistance with community centers, and the like, using the experience to teach and reinforce project management skills. These efforts have effectively extended the influence of the course

beyond its original boundaries.

Positive Comparison With Previous Methods. The community service project management course has evolved out of my 16 years of project management teaching experience. It grew from my desire to instill higher-level cognitive skills in students and provide them with tangible memories of important project management lessons. My previous approaches to teaching project management have included lectures, cases, teaming exercises, guest speakers, project site tours, computer simulations, and a comprehensive planning exercise. Based on student response and my own observations, I feel that the community service model provides the best method that I have found to date. I have not taught another course that has generated as much positive, ongoing contact from course alumni.

External Validation. In November of 1998, the project management course described here was awarded the Decision Sciences Institute's national award for teaching innovation. Twelve business faculty members from around the United States selected it from a field of 20 applicants. The contest involved a rigorous three-round elimination process, followed by formal presentations from three finalists. Since the time of the award announcement, several faculty members from universities in the U.S. and Mexico have begun to implement similar courses.

Broader Applications

This paper describes an application for teaching project management through service learning in a university environment. However, it also has great potential for application in business settings, and it appears that the precedent has already been set. One need only look at the company team projects initiated by course alumni to see that it can work in corporate settings. However, course alumni are not the only ones who have had this idea. Here are a few examples of company service activities that incorporate project management skills learning: Employees at Boeing regularly engage in community service activities such as Habitat for Humanity.

Employees from all levels at the Mercedes truck plant near Sao Paulo, Brazil, use project planning methods and concentrated team efforts to provide repairs to non-governmental community centers nearby. Employees at Recreational Equipment Incorporated participate frequently in trail repair and environmental projects in the mountains of Washington.

Employees at Timberland Corporation of New Hampshire helped to refurbish a residential center for troubled teens (Makower, 1994).

In each of these examples, employees have used project management concepts to execute their service activities, bringing new skills and insights back to their jobs. For example, Timberland's CEO, Jeff Swartz, reported a remarkable buzz within the workforce, and improvements in teaming and communication, when people returned to work after a service project (Makower, 1994). Given these experiences, it appears that the approach described here is appropriate for application in corporate settings.

Conclusion

Teaching project management to MBA students using a complex service activity can enhance students' higher-level cognitive skills, and it seems to play a role in their retention of key lessons. Moreover, it is clear that this approach to teaching project management can be effectively extended to corporate environments.

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[Author Affiliation]

Karen A. Brown, PMP, University of Washington, Bothell, Washington USA

[Author Affiliation]

About the Author

[Author Affiliation]

Karen A. Brown, PMP Ph.D., is professor of operations

[Author Affiliation]

and project management at the University of Washington, Bothell. The course described in this paper was taught at Seattle University, where she spent 16 years, most recently as Chair of the Department of Management. She has also served as a visiting professor at IESE in Barcelona and

[Author Affiliation]

CEIBS in Shanghai. Her research has appeared in numerous publications. She serves as a consultant and seminar leader to numerous organizations, including Boeing, Fluke Manufacturing, and Puget Sound Naval Shipyard.

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